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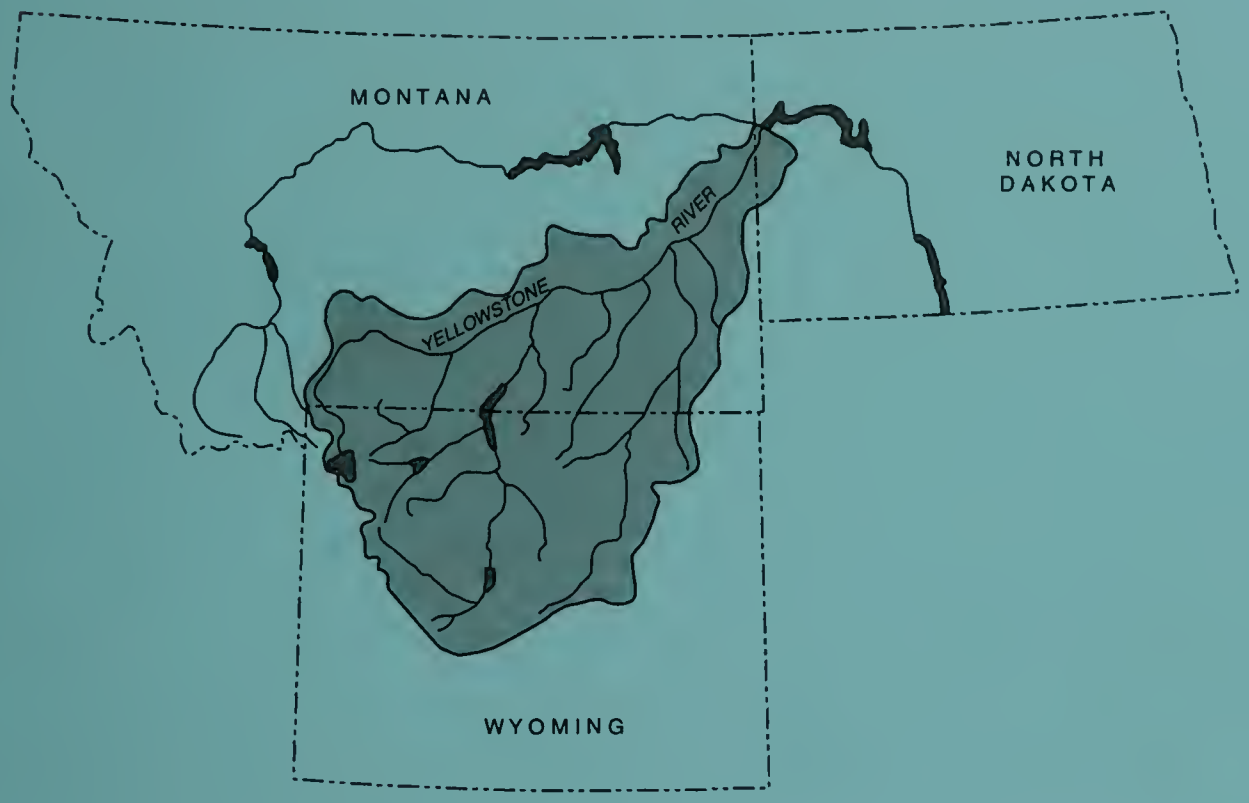
YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING MONTANA NORTH DAKOTA



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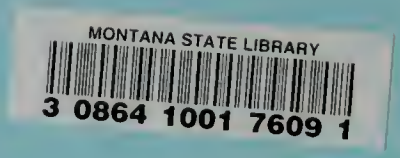

YELLOWSTONE RIVER

COMPACT COMMISSION

FIFTY-FIRST ANNUAL REPORT

2002

YELLOWSTONE RIVER COMPACT COMMISSION
DENVER FEDERAL CENTER, BUILDING 53, ROOM F-1200
LAKEWOOD, COLORADO 80225

Honorable David Freudenthal
Governor of the State of Wyoming
Cheyenne, Wyoming 82002

Honorable Judy Martz
Governor of the State of Montana
Helena, Montana 59620

Honorable John Hoeven
Governor of the State of North Dakota
Bismarck, North Dakota 58501

Dear Governors:

Pursuant to Article III of the Yellowstone River Compact, the Commission submits the following fifty-first annual report of activities for the period ending September 30, 2002.

Members of the Yellowstone River Compact Commission convened their fifty-first annual meeting on December 3, 2002, at 10:00 a.m. in Cody, Wyoming. In attendance were Mr. James Kircher, U.S. Geological Survey, Chairman and Federal Representative; Mr. Jack Stults, Administrator, Water Resources Division, Montana Department of Natural Resources and Conservation and Commissioner for Montana; and Mr. Patrick Tyrrell, Wyoming State Engineer and Commissioner for Wyoming. Also in attendance were Ms. Sue Lowry, Wyoming State Engineer's Office; Mr. Mike Whitaker and Mr. Don Englert, Wyoming State Board of Control; Mr. Keith Kerbel, Montana Department of Natural Resources and Conservation; Mr. Jerry Gibbens, Montgomery, Watson, and Harga, Denver, Colorado; and Mr. Myron Brooks and Mr. Robert Davis, U.S. Geological Survey.

Mr. Kircher called the meeting to order. All attendees introduced themselves.

Mr. Davis presented budget information for the program of streamflow data collection and preparation of the annual report. The program cost was $64,700 for Federal fiscal year 2002 and will be $66,900 for fiscal year 2003. Estimates of costs for future years were presented, based on an approximate 5-percent inflation factor per year. One-fourth of the cost is provided by the State of Wyoming, one-fourth by the State of Montana, and one-half by the U.S. Geological Survey through the Cooperative Water Program. The program for fiscal year 2003 was approved. Mr. Stults and Mr. Tyrrell expressed concern about the annual increases in costs, particularly in light of limited State budgets. Mr. Davis and Mr. Kircher explained that the increases are based on actual increases in the costs of monitoring and that the only available mechanism to reduce the costs would be an increase in Federal support for the National Streamflow Information Program (NSIP). The Commissioners for Montana and Wyoming agreed to

draft a letter to the Office of Management and Budget and the Congressional delegations for Wyoming and Montana stating support for NSIP, with copies to the Department of the Interior and the Director and the Associate Director for Water of the U.S. Geological Survey.

Mr. Davis reported that streamflow during water year 2002 was 83 percent of average for the Clarks Fork Yellowstone River, 36 percent of average for the Bighorn River (adjusted), 17 percent of average for the Tongue River, and 21 percent of average for the Powder River. Reservoir storage during water year 2002 decreased in Bighorn Lake, Boysen Reservoir, and Anchor Reservoir and increased in Bull Lake, Pilot Butte Reservoir, Buffalo Bill Reservoir, and Tongue River Reservoir. All of these reservoirs are in the Bighorn River basin except for Tongue River Reservoir, which is in the Tongue River basin. The contents and amounts of increase or decrease for each of these reservoirs are listed in the report. Total usable contents of the reservoirs at the end of water year 2002 was 1,246,300 acre-ft, which is a decrease of 73,400 acre-ft from the end of water year 2001. Total streamflow in the four rivers during water year 2002, adjusted for changes in Bighorn Lake storage and other factors, was 1,685,000 acre-ft. For comparison, the total adjusted streamflow in the four rivers was 2,053,000 acre-ft in water year 2001 and 2,861,000 acre-ft in water year 2000. Mr. Whitaker reported that storage in mountain reservoirs in Wyoming was at about 20 percent carryover, which is less than average but more than the carryover at the end of water year 2001, which was zero. He also reported that diversions in Wyoming in water year 2002 were about average and many water users tried to conserve usage.

Mr. Stults reported that no significant changes have occurred with the Montana water conservation program. The program in Montana is not a formalized statewide program and is based on the principles of productive water use and maintaining a healthy riverine environment. Many of the conservation activities are based on informal agreements. Mr. Tyrrell reported no changes in the program in Wyoming, although some changes might have been addressed in water plans for individual basins. The program in Wyoming is based primarily on making an optimal amount of water available to users. Mr. Tyrrell asked if water-conservation measures in Montana had resulted in changes in the amount or timing of return flows. Mr. Stults stated that no significant changes have been observed in several areas studied. Mr. Tyrrell asked about the percentage of involvement in the informal conservation agreements. Mr. Stults replied that user involvement in some basins—such as the Blackfoot, Jefferson, and Big Hole River basins—is high, perhaps greater than 80 percent. Most involvement is not centered on major river basins, such as the Yellowstone River, but rather on smaller, tributary basins. Mr. Tyrrell noted similar characteristics of involvement in Wyoming.

The Commissioners discussed the need for and benefit of planning for the current and continuing drought situation, and agreed to a meeting of technical specialists in late March 2003. Representatives from the Wyoming State Engineer's Office, Montana Department of Natural Resources and Conservation, U.S. Geological Survey, Natural Resources Conservation Service, and National Weather Service will be invited to participate. Ms. Lowry and Mr. Kerbel will make arrangements for the meeting, which probably will be held in Sheridan, Wyoming. The purpose of the meeting will be to provide information and education to help the two States better understand operations within the basins and identify possibilities for improving operations. Ms. Lowry recommended that specific topics include 1) forecasting methods and information, 2) summaries of current and historical information, 3) discussions of water and operational issues, and 4) recommendations to the Commissioners.

Ms. Lowry reported on the results of the technical group meeting held in January 2002. The results of the meeting are appended to these minutes.

The Commissioners agreed to recognize their appreciation of the services of Mr. Craig Cooper, Mr. Glen McDonald, and Mr. Jeff Fassett to the Commission. Ms. Lowry will draft the expressions of appreciation.

Mr. Tyrrell reported that coal-bed methane (CBM) development in Wyoming continues to be active but the rate of new development was less in 2002 than in 2001. The number of well permits issued by the Wyoming State Engineer's Office currently is 22,212. Approximately 1,750 reservoir applications have been received and 936 of those applications have been permitted. In general, permittees of reservoirs in Wyoming need to either allow for bypass of natural flows or otherwise allow for satisfaction of water rights downstream. Mr. Kerbel reported that 273 CBM wells have been permitted in Montana of which 234 are producing. Most of the wells are in the Decker area. The average amount of gas produced is 116 million cubic feet per day per well and the average amount of water produced is 5.2 gallons per minute per well. Mr. Tyrrell noted that the average amount of water produced in Wyoming is about 6 gallons per minute per well. Mr. Kerbel reported that the Statewide programmatic Environmental Impact Statement (EIS) for Montana is scheduled to be printed in final form by December 17, 2002. Major CBM development in Montana is not anticipated for approximately one year after release of the EIS. Mr. Stults added that challenges to the EIS are anticipated. Mr. Stults noted that the Montana Board of Environmental Review is considering establishment of standards for specific conductance and sodium adsorption ratio in water in major streams that could be affected by CBM water discharge. A decision from the Board is expected in January 2003. He also noted that permits for CBM well discharges typically would not include a water right and that monitoring and mitigation plans will be required for basins where CBM is being developed. Mr. Kerbel stated that $450,000 will be available to help resolve problems or disputes resulting from CBM development. Mr. Stults stated that Montana currently is considering a proposal for transboundary movement of limited amounts of produced CBM water to Wyoming. Permitting of such movement would require evidence of reasonable use and a benefit to Montana. Mr. Tyrrell noted possible interbasin transfer of CBM water from the Belle Fourche and Powder River basins to the Cheyenne River basin in Wyoming. Mr. Davis and Mr. Brooks described streamflow and water-quality monitoring activities of the U.S. Geological Survey in the Powder River, Tongue River, and Rosebud Creek basins in Montana and Wyoming, particularly as related to CBM. Streamflow is being monitored at more than 20 sites and water quality is being monitored at slightly less than 20 sites.

Mr. Kerbel reported on progress of the Montana statewide adjudication. Basins 42A, 43E, 43O, and 43P (Clarks Fork, Little Bighorn River, and Bighorn River basins) are currently being examined, basins 42B and 42C (Tongue River basin) have not yet been examined, basins 42I, 42J, and 42L (Powder River basin) have received a final decree, and basin 42KJ (middle Yellowstone River basin) is expected to have a preliminary decree by spring 2003.

Ms. Lowry reported that the Wyoming Water Planning Program is still active. Mr. Jerry Gibbens described current efforts in the Wind River and Bighorn River basin, Clarks Fork basin, and the uppermost Yellowstone River basin. A model is being developed to use as a planning and management tool and is expected to be available in early 2003. The model will be used to help evaluate the impacts of

future water uses and potential water projects. Basin advisory groups are active in the planning program. Ms. Lowry stated that the Platte River basin will be evaluated and modeled next.

Mr. Stults reported that the Montana/Crow Tribe water-rights compact is awaiting Congressional ratification, after which it will be submitted for Tribal ratification. Many changes have occurred recently in the Crow tribal government but tribal support for the compact currently is strong.

Mr. Brooks reported that the Yellowstone River Basin National Water-Quality Assessment (NAWQA) project is now in a reduced sampling phase. The Little Powder River near Weston, Yellowstone River at Forsyth, and Yellowstone River at Sidney will be sampled 11 times per year for a limited set of constituents. Seven reports are being prepared, most of which are anticipated to be available within the coming year. A liaison committee meeting is scheduled for summer 2003.

The next meeting is tentatively scheduled for December 2, 2003, in Montana. Mr. Stults agreed to make arrangements for that meeting.

The meeting adjourned at 1:45 p.m.

Patrick T. Tyrrell
Commissioner for Wyoming

Jack Stults
Commissioner for Montana

James E. Kircher
Chairman and Federal Representative

Summary of Meeting between Montana and Wyoming
to discuss Water Supply Issues in the Tongue River Basin
January 16, 2002
Water Division Office
Sheridan, WY

The following attended the meeting:

Name	Agency	Location
Mike Whitaker	Division 2 Superintendent	Sheridan
Carmine LoGuidice	Div. 2 Asst. Superintendent	Sheridan
Bill Knapp	Hydrographer-Commissioner	Sheridan
David Pelloux	Hydrographer-Commissioner	Sheridan
Sue Lowry	Wyo. State Engineer's Office	Cheyenne
Rich Moy	MT DNRC	Helena
Jim Robinson	MT DNRC	Helena
Keith Kerbel	MT DNRC	Billings

Montana started the discussion stating that they were interested in learning more about the hydrology and forecasting abilities in the Tongue River drainage for a couple of reasons. First, they are receiving inquiries from irrigators and other water users along the Tongue River about Wyoming's water use and Montana is interested in understanding more about the upper system in order to answer these inquiries. Secondly, the reservoir operations branch of the DNRC has completed some analyses and is concerned about the low inflow to Tongue River reservoir during the drought conditions in past years. As the enlargement to that reservoir has not been in place for that many years, it's difficult to assess the impact of these drought years to the inflow. Montana would also be interested in having better forecasting abilities in order to predict earlier in the year what type of inflows Tongue River Reservoir might receive. Inflows to the reservoir last year were around 13,000 acre-ft and the downstream irrigators negotiated a deal with the Northern Cheyenne for storage water from the tribe's storage space in the reservoir.

The Sheridan office personnel described the location of the various SNOTEL sites in the Big Horn mountains that can be useful predictors of runoff for the Tongue River basin. Carmine pointed out that while snowpack is one important component in predicting runoff, many other factors also play a role. He stated that with an average of about 65% snowpack last year, that amount of snowpack only resulted in streamflows of 25-35% of average. Due to the low antecedent soil moisture this past fall, similar conditions would be expected for this coming runoff season.

Rich asked about the general irrigation practices in the basin and whether the Wyoming irrigators tend to turn on their water supplies earlier when a drought appears imminent. Mike responded that he didn't think the operations were much different in 2001, but it's possible that irrigators might start earlier this coming summer if conditions don't improve. It was pointed out that 2001 was an extremely dry year and that several new daily low readings were experienced at long-term USGS gages in the basin. Bill noted that the town of

Dayton has a 1907 water right that was in danger of being shut off and the town negotiated a deal with an 1887 water right holder for an additional cfs for municipal use.

Montana then asked about the various storage facilities in the tributaries to the Tongue River. Mike gave Rich a copy of the Hydrographers Report for last year. A complete listing of the reservoirs, their location and their capacities is included in the report. The Hydrographers Report also includes the individual diversion readings for each of the ditches regulated during the season, as well as additional streamflow measurements.

Montana described the various citizen initiatives and resource groups that are meeting in the Yellowstone basin in Montana. These groups are interested in the variability of water supplies and will be analyzing the tributary inflows, including the flows originating in Wyoming. Discussion was held concerning the types of older aerial photography that might be available and how to locate such photography.

Wyoming's water planning efforts in the Powder-Tongue are nearing completion. HKM consultants should have the final spreadsheet model completed by the end of March or so. Wyoming agreed to furnish Montana with a copy of the model and other products from the water-planning program. These data should be helpful in looking at "what-if" scenarios for the basin. Wyoming also agreed to get a copy of the 1973 water-planning document for the northeast portion of Wyoming to Montana.

After Montana has had a chance to review the water planning information and the information from the SNOTEL sites and streamgages, this group may want to discuss any remaining questions, but we did not feel there was a need for an on-going Technical Committee of the Yellowstone Compact Commission.

Sue Lowry
1/29/02

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4. Powder River near Locate, Mont. 12

GENERAL REPORT

Cost of operation and budget

The work funded by the Yellowstone River Compact Commission, which to date has been primarily concerned with the collection of required hydrologic data, has been financed through cooperative arrangements whereby Montana and Wyoming each bear one-fourth of the cost and the remaining one-half is borne by the United States. The salaries and necessary expenses of the State and U.S. Geological Survey representatives, and the cost to other agencies of collecting hydrologic data, are not considered as expenses of the Commission.

The expense of the Commission during fiscal year 2002 was $64,700, in accordance with the budget adopted for the year.

The estimated budgets for Federal fiscal years 2003, 2004, 2005, and 2006, based on an approximate 5-percent increase per year, were tentatively adopted subject to the availability of appropriations. The budgets for the four fiscal years are summarized as follows:

October 1, 2002, to September 30, 2003 (fiscal year 2003):	
Estimate for continuation of existing streamflow-gaging programs	$66,900
October 1, 2003, to September 30, 2004 (fiscal year 2004):	
Estimate for continuation of existing streamflow-gaging programs	$70,800
October 1, 2004, to September 30, 2005 (fiscal year 2005):	
Estimate for continuation of existing streamflow-gaging programs	$74,300
October 1, 2005, to September 30, 2006 (fiscal year 2006):	
Estimate for continuation of existing streamflow-gaging programs	$78,000

Streamflow-gaging station operation

Streamflow-gaging stations at the measuring sites specified in the Yellowstone River Compact were continued in operation and satisfactory records were collected at each station. Locations of streamflow-gaging stations, along with reservoir stations, are shown on a map of the Yellowstone River Basin at the end of the report.

For measurement sites, horizontal coordinate information (latitude and longitude) is referenced to the North American Datum of 1927 (NAD 27). The gage datums and elevations listed in this report are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 1929).

During water year 2002, annual streamflow was below normal[1] at all reporting Yellowstone River Compact gaging stations, except Clarks Fork Yellowstone River at Edgar, which was in the normal range.

Station number	Measurement site	Percent of average[2]
06208500	Clarks Fork Yellowstone River at Edgar, Mont., minus diversions to White Horse Canal	83
06294500	Bighorn River above Tullock Creek, near Bighorn, Mont., minus Little Bighorn River near Hardin, Mont. Adjusted for change in contents in Bighorn Lake	36
06308500	Tongue River at Miles City, Mont.	17
06326500	Powder River near Locate, Mont.	21

[1]The "normal" range is 80 to 120 percent of average.
[2]Average is based on period of record at station.

Tabulation of streamflow data for water year 2002 and graphical comparisons with average flows for the preceding year and for selected base periods are given in the section "Summary of discharge for Compact streamflow-gaging stations."

Diversions

No diversions were regulated by the Commission during the year.

Storage in reservoirs

Reservoirs completed after January 1, 1950

Bighorn Lake, a Bureau of Reclamation project on the Bighorn River, and the largest storage project in the basin, contained 744,400 acre-feet at the beginning of the year and 619,000 acre-feet at the end of the year. Daily contents ranged from 607,200 acre-feet on September 9, 2002 to 757,000 acre-feet on November 10, 2001. Boysen Reservoir, located on the Wind River and operated by the Bureau of Reclamation, began the year with 264,300 acre-feet in storage and ended the year with 198,900 acre-feet. Anchor Reservoir began the year with 266 acre-feet in storage and ended the year with 254 acre-feet. Month-end and year-end contents and a description of these reservoirs are given in the section "Monthly summary of contents for Compact reservoirs completed after January 1, 1950." The Commission is cognizant of other reservoirs in the Yellowstone River basin and considers their aggregate effect to be insufficient to warrant the collection of storage data at this time.

Reservoirs existing on January 1, 1950

As a matter of record and general information, month-end contents are given later in the report for reservoirs in existence upstream from the points of measurement on January 1, 1950. The reservoirs are Bull Lake, Pilot Butte Reservoir, Buffalo Bill Reservoir, and Tongue River Reservoir. These data are pertinent to allocation under Article V, Section C, Item 3 of the Compact.

The capacity of Buffalo Bill Reservoir was increased in 1992 from 456,600 acre-feet to 644,540 acre-feet (listed as 646,565 acre-feet by Bureau of Reclamation). The capacity of Tongue River Reservoir was increased in 1999 from 68,000 acre-feet to 79,100 acre-feet.

SUMMARY OF DISCHARGE FOR COMPACT STREAMFLOW-GAGING STATIONS

06208500 Clarks Fork Yellowstone River at Edgar, Mont.

LOCATION.--Lat 45°27'58", long 108°50'35", in $SE^1/_4SE^1/_4SE^1/_4$ sec.23, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at river mile 22.1.
DRAINAGE AREA.--2,032 mi^2.
PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to current year.
REVISED RECORDS.--WSP 1509: 1924, 1932(M). WSP 1729: Drainage area.
GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft. Prior to Aug. 31, 1953, nonrecording gage at same site and datum.
REMARKS.--Discharge records good except those for the estimated daily discharges, which are poor. Diversions for irrigation of about 41,500 acres, of which about 840 acres lies downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek basin. U.S. Geological Survey satellite telemeter at station. **Figures of discharge given herein have the flow of White Horse Canal subtracted.**

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	215	440	446	e330	e300	e220	294	687	7300	3350	580	140
2	215	439	408	e340	e310	e210	294	663	8240	3130	525	151
3	215	436	416	e350	e310	e230	289	612	7650	2740	504	149
4	220	427	426	e350	e320	e250	270	779	5790	2340	484	120
5	245	413	404	e340	e330	e240	290	767	4720	2030	515	105
6	275	400	396	e340	e330	e220	309	841	4660	1860	456	98
7	279	404	407	e350	e350	e220	341	801	5500	1760	375	131
8	292	421	415	e350	e340	e220	443	747	5400	1620	370	181
9	305	487	388	e350	e320	e230	461	717	4540	1530	419	348
10	323	435	400	e340	e320	e260	437	595	3750	1440	414	367
11	336	429	393	e350	e330	e260	413	576	2840	1260	355	347
12	343	407	378	e370	e320	e250	411	541	2260	1050	304	340
13	354	430	416	e340	e330	e260	388	553	1900	925	250	338
14	375	445	408	e330	e320	e240	376	712	1700	825	207	315
15	393	423	e400	e310	e310	e240	523	1260	2030	761	161	281
16	383	416	e400	e310	e320	e240	960	1470	2760	707	151	264
17	385	408	e410	e320	e320	e220	687	1490	3720	732	162	231
18	382	416	e400	e310	e320	e220	620	1530	4510	830	159	255
19	402	443	e410	e330	e310	e220	548	2080	5450	1030	163	270
20	412	431	e400	e330	e310	e200	472	3350	4670	1080	159	291
21	396	387	e400	e340	e300	e180	421	4220	3860	1090	143	315
22	385	406	e350	e330	e310	e220	398	4360	3760	1080	127	358
23	388	446	e350	e290	e250	e260	373	3460	3850	1100	116	390
24	384	436	e360	e300	e200	e280	371	2510	3780	1240	116	379
25	412	435	e370	e330	e170	292	361	1880	3960	1120	114	366
26	418	426	e380	e330	e200	291	347	1540	4050	1030	105	375
27	412	417	e380	e320	e250	296	422	1540	4030	953	105	385
28	433	420	e370	e320	e240	317	540	1780	3660	938	118	395
29	429	400	e320	e300	---	302	520	2330	3380	1090	136	402
30	449	419	e300	e290	---	298	471	3530	3340	814	157	384
31	436	---	e320	e300	---	289	---	5760	---	705	143	---
TOTAL	10891	12742	12021	10190	8340	7675	13050	53681	127060	42160	8093	8471
MEAN	351.3	424.7	387.8	328.7	297.9	247.6	435.0	1732	4235	1360	261.1	282.4
MAX	449	487	446	370	350	317	960	5760	8240	3350	580	402
MIN	215	387	300	290	170	180	270	541	1700	705	105	98
AC-FT	21600	25270	23840	20210	16540	15220	25880	106500	252000	83620	16050	16800

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 2002, BY WATER YEAR (WY)*

MEAN	534.1	500.6	408.9	351.1	348.8	364.2	558.1	2108	4073	2031	616.1	477.4
MAX	1010	777	593	512	584	554	1398	5578	7256	4771	1541	1395
(WY)	1942	1928	1996	1997	1963	1943	1943	1928	1996	1943	1951	1941
MIN	298	310	217	200	180	220	123	757	1768	290	49.5	156
(WY)	1956	1936	1937	1922	1922	1924	1961	1968	1987	1988	1988	1988

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1921 - 2002*	
ANNUAL TOTAL	226905		314374			
ANNUAL MEAN	621.7		861.3		1032	
HIGHEST ANNUAL MEAN					1623	1997
LOWEST ANNUAL MEAN					644	2001
HIGHEST DAILY MEAN	5590	Jun 14	8240	Jun 2	10600	Jun 2 1936
LOWEST DAILY MEAN	79	Aug 16	98	Sep 6	37	May 11 1961
ANNUAL SEVEN-DAY MINIMUM	84	Aug 21	114	Aug 22	43	Apr 18 1961
MAXIMUM PEAK FLOW			8720	Jun 2	11100	Jun 12 1997
MAXIMUM PEAK STAGE			8.39	Jun 2	9.30	Jun 12 1997
INSTANTANEOUS LOW FLOW					36	Apr 22 1961
ANNUAL RUNOFF (AC-FT)	450100		623600		747800	
10 PERCENT EXCEEDS	1840		2410		2850	
50 PERCENT EXCEEDS	336		387		470	
90 PERCENT EXCEEDS	138		220		271	

*--During period of operation (water years 1921-69, 1987 to current year).
e--Estimated.

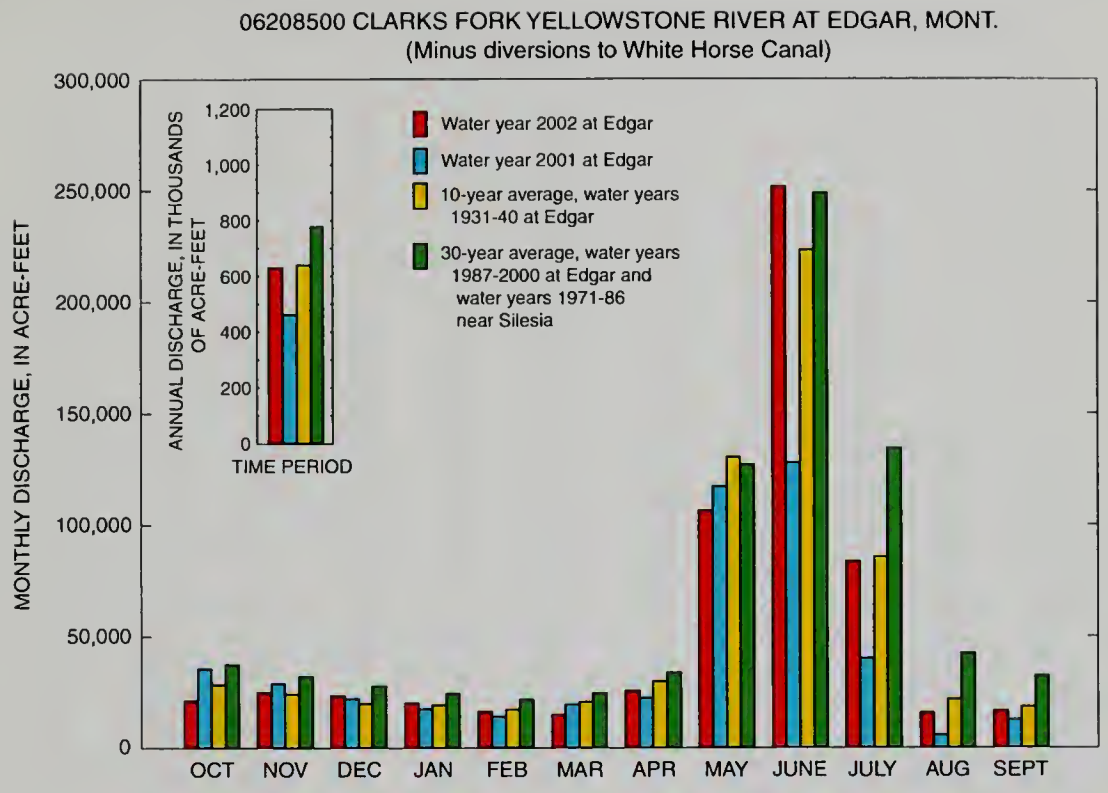


Figure 1. Comparison of discharge of the Clarks Fork Yellowstone River during water year 2002 with discharge during water year 2001 and with 10-year and 30-year average discharges.

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44'09", long 107°33'24", in SE¼NE¼NE¼ sec.19, T.1 S., R.34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream from terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.
DRAINAGE AREA.--1,294 mi².
PERIOD OF RECORD.--June 1953 to current year.
REVISED RECORDS.--WDR MT-86-1: 1978.
GAGE.--Water-stage recorder. Datum of gage is 2,882.29 ft (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mi downstream. Oct. 7, 1953 to May 6, 1963, water-stage recorder at site 0.3 mi downstream. May 6, 1963 to Nov. 6, 1963, nonrecording gage at site 0.4 mi downstream. All at different datums. Nov. 7, 1963 to Aug. 15, 1976, water-stage recorder at site 35 ft downstream at present datum. Aug. 15, 1976 to Sept. 30, 1979, water-stage recorders were located on each bank downstream from Sarpy Road bridge and were used depending on control conditions.
REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of 20,980 acres upstream from station. U.S. Geological Survey satellite telemeter at station. Unpublished records of instantaneous water temperature and specific conductance are available in files of the District office. **Figures of discharge given herein include flow of terminal wasteway of Agency Canal.**

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	81	e70	e60	e60	e45	e75	97	375	49	36	21
2	18	80	e80	e65	e65	e45	e70	101	434	48	25	13
3	20	81	e90	e70	e70	e50	e80	135	453	24	13	13
4	28	82	e80	e75	e75	e60	e90	141	439	15	8.3	7.5
5	29	83	e80	e75	e80	e60	e100	133	363	10	6.4	4.5
6	34	82	e80	e70	e80	e65	126	128	309	8.4	8.4	8.0
7	48	83	e75	e70	e80	e60	137	121	290	6.9	13	9.0
8	52	85	e75	e70	e80	e60	208	123	271	5.8	22	22
9	52	85	e70	e70	e80	e60	205	120	268	4.6	49	15
10	56	87	e70	e75	e80	e60	192	122	282	3.1	53	5.4
11	58	86	e65	e80	e75	e55	160	117	269	2.4	79	10
12	62	89	e60	e85	e80	e60	133	111	238	3.8	96	16
13	62	88	e60	e85	e80	e70	129	107	210	2.6	103	15
14	68	88	e70	e80	e80	e70	121	100	197	3.8	82	12
15	68	88	e65	e75	e80	e70	112	95	181	5.2	59	12
16	74	90	e60	e70	e80	e80	109	93	166	4.4	43	12
17	77	89	e60	e65	e80	e80	115	97	155	38	40	12
18	74	88	e70	e60	e75	e75	129	102	137	56	56	11
19	74	87	e70	e65	e75	e75	127	101	130	27	60	9.9
20	75	89	e65	e70	e70	e80	127	105	129	39	58	9.6
21	76	89	e60	e75	e70	e80	126	119	125	48	67	15
22	e76	87	e60	e80	e70	e80	120	243	131	60	54	38
23	e76	92	e55	e80	e65	e80	111	347	130	56	31	42
24	e76	95	e60	e80	e60	e85	111	352	123	49	17	37
25	e71	e80	e60	e80	e50	e90	112	278	125	64	8.3	38
26	e75	e70	e55	e70	e40	e90	109	233	112	80	16	46
27	e75	e60	e55	e65	e45	e90	110	212	105	73	15	49
28	e75	e60	e55	e65	e45	e85	110	208	84	75	17	53
29	e75	e65	e50	e60	---	e85	103	208	60	85	13	53
30	e75	e70	e55	e70	---	e80	94	224	56	63	15	66
31	81	---	e55	e70	---	e80	---	279	---	39	16	---
TOTAL	1882	2479	2035	2230	1970	2205	3651	4952	6347	1049.0	1179.4	674.9
MEAN	60.71	82.63	65.65	71.94	70.36	71.13	121.7	159.7	211.6	33.84	38.05	22.50
MAX	81	95	90	85	80	90	208	352	453	85	103	66
MIN	18	60	50	60	40	45	70	93	56	2.4	6.4	4.5
AC-FT	3730	4920	4040	4420	3910	4370	7240	9820	12590	2080	2340	1340

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2002, BY WATER YEAR (WY)

MEAN	155.3	153.6	136.0	141.6	202.2	313.5	316.0	613.6	826.9	267.0	119.6	128.0
MAX	276	248	223	366	610	987	748	2852	1981	1333	382	267
(WY)	1979	1979	1979	1975	1971	1972	1965	1978	1968	1975	1975	1978
MIN	60.7	82.6	65.6	71.6	70.3	71.1	54.8	71.9	117	8.50	2.46	19.1
(WY)	2002	2002	2002	1988	1989	2002	1961	1961	1961	1961	1961	1960

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1954 - 2002	
ANNUAL TOTAL	38525.3		30654.3			
ANNUAL MEAN	105.5		83.98		280.9	
HIGHEST ANNUAL MEAN					676	1975
LOWEST ANNUAL MEAN					70.4	1961
HIGHEST DAILY MEAN	421	Apr 11	a453	Jun 3	15800	May 20 1978
LOWEST DAILY MEAN	6.9	Aug 26	a2.4	Jul 11	0.30	Aug 5 1961
ANNUAL SEVEN-DAY MINIMUM	13	Aug 24	3.6	Jul 10	0.40	Aug 3 1961
MAXIMUM PEAK FLOW			b512	Jun 3	c22600	May 19 1978
MAXIMUM PEAK STAGE					d11.78	Mar 20 1960
INSTANTANEOUS LOW FLOW					f0.20	Aug 7 1961
ANNUAL RUNOFF (AC-FT)	76410		60800		203500	
10 PERCENT EXCEEDS	216		133		609	
50 PERCENT EXCEEDS	89		75		164	
90 PERCENT EXCEEDS	26		15		75	

a--Includes Agency Canal
b--Gage height, 3.48 ft. Peak flow includes Agency Canal.
c--Gage height, 11.20 ft.
d--Site and datum then in use.
e--Estimated.
f--Result of discharge measurement.

06294500 Bighorn River above Tullock Creek, near Bighorn, Mont.

LOCATION.--Lat 46°07'29", long 107°28'06", in $SE^1/_4SE^1/_4NE^1/_4$ sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 1.9 mi upstream from Tullock Creek, 3.6 mi southwest of Bighorn, 4.5 mi southeast of Custer, and at river mile 3.0.

DRAINAGE AREA.--22,414 mi^2. Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.--October 1981 to current year. Previously published as "06294700 Bighorn River at Bighorn, MT" 1956-81, and as "near Custer" 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft. May 11, 1945 to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945 to Oct. 6, 1955, water-stage recorder 1.7 mi upstream at different datum. Oct. 7, 1955 to Sept. 30, 1981, at site 2.3 mi downstream at different datum.

REMARKS.--Discharge records good except those for estimated daily discharges, which are poor. Flow regulated by Bighorn Lake beginning November 1965 (usable capacity, 1,312,000 acre-ft). Major regulation prior to November 1965 by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1310	1360	1550	e1700	e1700	e1600	1470	1550	1810	1110	1470	1790
2	1290	1350	1560	e1700	e1700	e1600	1460	1640	1990	1060	1540	1810
3	1280	1340	1590	e1700	e1700	e1600	1450	1640	2050	953	1580	1780
4	1290	1350	1580	1740	e1750	e1600	1470	1670	2010	963	1570	1760
5	1310	1330	1570	1530	e1750	e1600	1460	1660	1870	1000	1650	1740
6	1300	1320	1570	1500	e1800	e1600	1460	1660	1720	961	1600	1720
7	1340	1310	1580	1500	e1800	e1500	1470	1680	1630	984	1560	1760
8	1330	1300	1560	1550	e1850	e1450	1530	1700	1600	976	1580	1850
9	1300	1380	1590	1570	1870	e1500	1580	1720	1660	973	1620	1890
10	1290	1390	1600	1560	1880	e1650	1470	1720	1720	1150	1600	1820
11	1320	1380	1570	1560	1900	e1650	1540	1640	1650	1180	1580	1790
12	1230	1380	1560	1570	1910	e1650	1460	1600	1560	1230	1570	1670
13	1220	1370	1550	1570	1920	e1650	1420	1590	1500	1250	1470	1640
14	1180	1370	e1550	1590	1930	1670	1440	1530	1480	1270	1460	1610
15	1190	1350	e1500	1590	1920	1640	1420	1490	1460	1340	1490	1590
16	1160	1340	e1550	1620	1930	1650	1480	1460	1460	1290	1500	1580
17	1160	1480	1610	1610	1930	1660	1440	1410	1460	1390	1550	1540
18	1140	1560	1620	e1600	1940	1640	1540	1450	1440	1590	1590	1560
19	1120	1550	1620	e1650	1960	1610	1550	1430	1450	1440	1610	1590
20	1120	1540	1590	1640	1980	1450	1490	1400	1470	1390	1520	1530
21	1210	1550	e1550	1640	1990	1130	1550	1390	1490	1450	1510	1500
22	1200	1540	e1550	1680	1980	e1400	1530	1650	1570	1530	1560	1500
23	1200	1560	e1600	1680	1550	e1450	1520	2140	1670	1540	1580	1480
24	1180	1560	e1600	e1700	e1500	e1450	1510	2020	1610	1520	1770	1440
25	1170	e1500	e1650	e1700	e1400	1480	1620	1890	1540	1490	1970	1260
26	1370	e1450	e1650	e1500	e1500	1460	1520	1810	1450	1530	1690	1240
27	1420	e1500	e1500	e1550	e1550	1440	1520	1780	1390	1520	1570	1180
28	1400	1520	e1600	e1600	e1550	1450	1540	1720	1330	1550	1630	1160
29	1390	1510	e1650	e1650	---	1440	1510	1670	1170	1480	1650	1160
30	1390	1540	e1700	e1650	---	1470	1490	1680	1100	1430	1670	1150
31	1380	---	e1700	e1650	---	1460	---	1780	---	1440	1720	---
TOTAL	39190	42980	49220	50050	50140	47600	44910	51170	47310	39980	49430	47090
MEAN	1264	1433	1588	1615	1791	1535	1497	1651	1577	1290	1595	1570
MAX	1420	1560	1700	1740	1990	1670	1620	2140	2050	1590	1970	1890
MIN	1120	1300	1500	1500	1400	1130	1420	1390	1100	953	1460	1150
AC-FT	77730	85250	97630	99270	99450	94410	89080	101500	93840	79300	98040	93400

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2002, BY WATER YEAR (WY)

MEAN	3253	3318	3157	3043	3213	3713	3566	4412	6994	5356	2863	2856
MAX	5546	5599	4907	5478	5314	6580	7881	9102	15180	19090	6972	4952
(WY)	1972	1974	1968	1968	1971	1972	1997	1947	1948	1967	1997	1973
MIN	1264	1223	1280	1382	1791	908	1063	1304	1050	707	868	1009
(WY)	2002	1978	1961	1961	2002	1966	1966	1966	1966	1960	1961	1966

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1945 - 2002	
ANNUAL TOTAL	714720		559070			
ANNUAL MEAN	1958		1532		3795	
HIGHEST ANNUAL MEAN					5594	1997
LOWEST ANNUAL MEAN					1532	2002
HIGHEST DAILY MEAN	3100	Apr 11	2140	May 23	50000	May 20 1978
LOWEST DAILY MEAN	1120	Oct 19	953	Jul 3	400	Apr 4 1967
ANNUAL SEVEN-DAY MINIMUM	1150	Oct 14	973	Jul 3	528	May 6 1961
MAXIMUM PEAK FLOW			a2450	Aug 25	c59200	May 20 1978
MAXIMUM PEAK STAGE			b8.00	Mar 3	14.15	May 20 1978
INSTANTANEOUS LOW FLOW					d275	Nov 15 1959
ANNUAL RUNOFF (AC-FT)	1418000		1109000		2749000	
10 PERCENT EXCEEDS	2520		1770		6320	
50 PERCENT EXCEEDS	1960		1550		3200	
90 PERCENT EXCEEDS	1350		1270		1770	

SUMMARY STATISTICS	WATER YEARS 1946-1961*		WATER YEARS 1967 - 2002**	
ANNUAL MEAN	3358		3870	
HIGHEST ANNUAL MEAN	5501	1947	5594	1997
LOWEST ANNUAL MEAN	1623	1961	1532	2002
HIGHEST DAILY MEAN	25700	Jun 23 1947	50000	May 20 1978
LOWEST DAILY MEAN	462	May 12 1961	400	Apr 4 1967
ANNUAL SEVEN-DAY MINIMUM	528	May 6 1961	843	Nov 18 1977
MAXIMUM PEAK FLOW	f26200	Jun 24 1947	c59200	May 20 1978
MAXIMUM PEAK STAGE	b10.65	May 20 1947	14.15	May 20 1978
INSTANTANEOUS LOW FLOW	d275	Nov 15 1959	d275	Nov 15 1959
ANNUAL RUNOFF (AC-FT)	2578000		2804000	
10 PERCENT EXCEEDS	6200		6270	
50 PERCENT EXCEEDS	2810		3420	
90 PERCENT EXCEEDS	1500		1930	

*--Prior to construction of Yellowtail Dam.
**--After completion of Yellowtail Dam.
a--Gage height, 1.59 ft.
b--Backwater from ice.
c--Gage height, 14.50 ft, at different site and datum.
d--About, result of freezeup.
e--Estimated.
f--Gage height, 8.79 ft, at different site and datum.

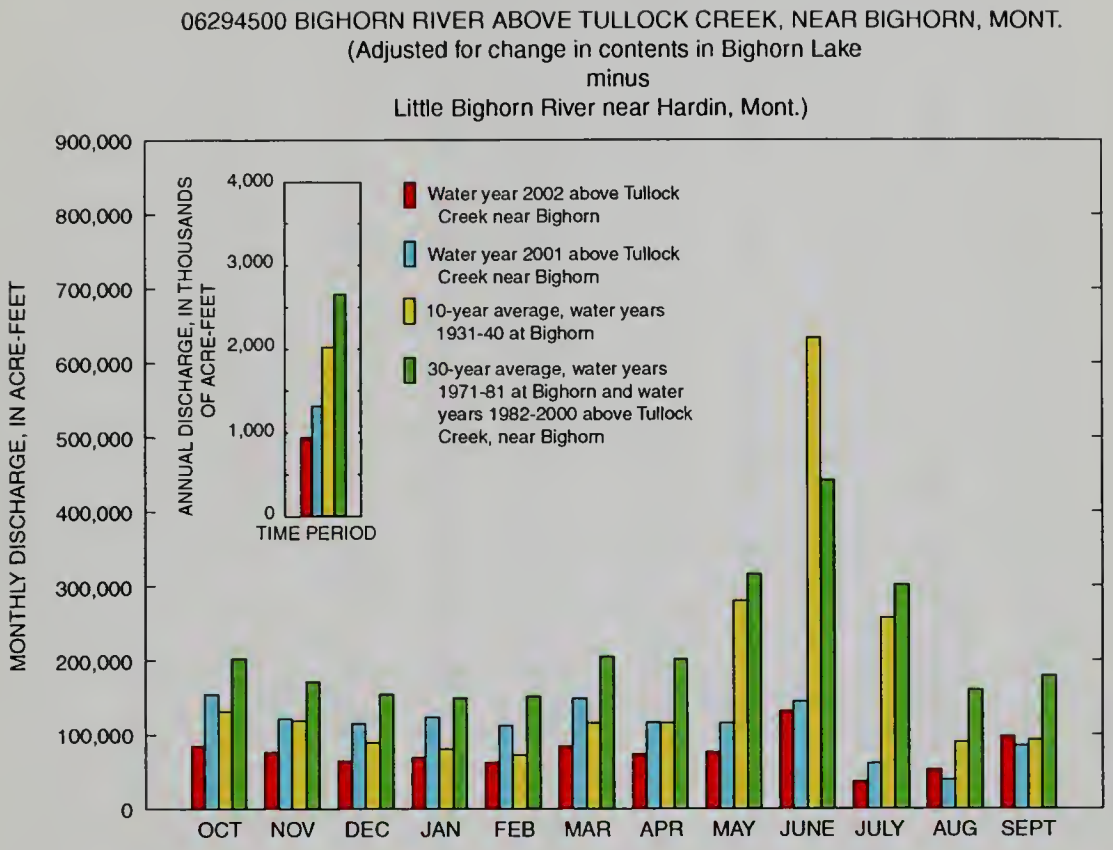


Figure 2. Comparison of discharge of the Bighorn River during water year 2002 with discharge during water year 2001 and with 10-year and 30-year average discharges.

LOCATION.--Lat 46°23'05", long 105°50'41", in SE¼SE¼SE¼ sec. 4, T.7 N., R.47 E., Custer County, Hydrologic Unit 10090102, on right bank 1.5 mi south of Miles City and at river mile 2.3.

DRAINAGE AREA.--5,397 mi^2. Area at site used prior to Oct. 4, 1995, 5,379 mi^2.

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. April 1946 to Oct. 4, 1995, at site 2.5 mi upstream. Flows at present site are equivalent with site operated from 1946. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,360 ft. April 1938 to April 1942, nonrecording gage at site 8 mi upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher. Oct. 4, 1995, gage was moved 2.5 miles downstream.

REMARKS.--Discharge records good except those for estimated daily discharges, which are poor. Flow regulation by Tongue River Reservoir (station 0630700) (capacity of 79,100 acre-feet), and many small reservoirs in Wyoming (combined capacity about 15,000 acre-ft). Diversions for irrigation of about 100,800 acres upstream from station. U. S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.1	112	e90	e85	e70	e70	e80	91	10	24	9.5	17
2	7.8	108	e120	e95	e75	e75	e70	88	9.1	16	14	17
3	8.3	108	e120	e100	e80	e80	e80	85	12	12	15	14
4	27	108	e110	e105	e85	e85	e95	85	12	9.8	12	14
5	25	107	e110	e105	e90	e80	e120	85	14	10	10	13
6	25	108	e110	e105	e90	e70	161	90	12	11	53	15
7	26	108	e110	e110	e90	e65	154	84	10	20	32	15
8	27	107	e110	e105	e90	e55	156	92	7.8	20	31	34
9	29	107	e100	e100	e90	e65	155	91	13	27	29	224
10	31	106	e100	e90	e90	e85	151	83	13	39	27	102
11	33	106	e100	e85	e90	e95	144	82	16	26	22	48
12	36	108	e100	e80	e90	e95	135	76	29	19	23	63
13	41	108	e100	e75	e90	e90	123	71	25	16	24	28
14	47	108	e100	e70	e90	e85	117	70	23	14	21	23
15	50	109	e100	e65	e95	e80	114	57	21	9.2	15	22
16	53	110	e90	e60	e95	e75	112	53	19	7.3	14	22
17	31	110	e100	e60	e100	e70	111	47	20	28	17	22
18	79	109	e100	e55	e100	e65	132	50	20	77	17	23
19	109	102	e100	e60	e105	e60	159	50	27	39	13	34
20	109	111	e95	e65	e100	e55	187	48	28	22	10	22
21	109	115	e95	e65	e95	e55	171	48	31	14	10	17
22	111	106	e95	e65	e90	e60	146	58	57	10	15	16
23	115	108	e95	e70	e80	e70	125	114	52	11	17	16
24	117	111	e95	e75	e65	e70	112	124	72	12	13	17
25	120	113	e100	e80	e50	e70	104	127	262	8.4	11	32
26	120	107	e100	e75	e55	e70	101	139	180	7.3	14	32
27	116	96	e100	e65	e60	e75	98	107	103	8.1	16	32
28	116	e80	e90	e55	e65	e80	94	19	76	17	19	33
29	114	e70	e85	e50	---	e85	96	10	53	25	16	33
30	113	e110	e80	e50	---	e90	94	12	30	17	21	33
31	115	---	e80	e60	---	e85	---	13	---	13	19	---
TOTAL	2068.2	3176	3080	2385	2365	2310	3697	2249	1256.9	589.1	579.5	1033
MEAN	66.72	105.9	99.35	76.94	84.46	74.52	123.2	72.55	41.90	19.00	18.69	34.43
MAX	120	115	120	110	105	95	187	139	262	77	53	224
MIN	7.8	70	80	50	50	55	70	10	7.8	7.3	9.5	13
AC-FT	4100	6300	6110	4730	4690	4580	7330	4460	2490	1170	1150	2050

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2002, BY WATER YEAR (WY)*

MEAN	246.6	256.1	191.5	196.4	281.3	532.4	441.4	692.0	1266	466.5	182.2	200.1
MAX	694	585	423	529	1794	1783	1693	2983	3825	2207	700	599
(WY)	1972	1942	1950	1999	1971	1971	1965	1978	1978	1975	1975	1968
MIN	10.3	60.9	68.0	76.9	84.5	74.5	12.5	29.2	41.9	12.6	6.08	2.40
(WY)	1961	1989	1990	2002	2002	2002	1961	1961	2002	1960	1949	1938

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1938 - 2002*	
ANNUAL TOTAL	42583.0		24788.7			
ANNUAL MEAN	116.7		67.91		409.4	
HIGHEST ANNUAL MEAN					986	1978
LOWEST ANNUAL MEAN					57.2	1961
HIGHEST DAILY MEAN	848	Jul 27	262	Jun 25	9290	Jun 15 1962
LOWEST DAILY MEAN	6.5	Aug 30	a7.3	Jul 16	0.00	Jul 9 1940
ANNUAL SEVEN-DAY MINIMUM	8.2	Aug 25	10	Jul 21	0.00	Jul 9 1940
MAXIMUM PEAK FLOW			b335	Jun 25	d13300	Jun 15 1962
MAXIMUM PEAK STAGE			c3.84	Mar 29	d13.27	Mar 19 1960
ANNUAL RUNOFF (AC-FT)	84460		49170		296600	
10 PERCENT EXCEEDS	212		113		918	
50 PERCENT EXCEEDS	109		71		224	
90 PERCENT EXCEEDS	17		13		69	

*--During period of operation (April 1938 to April 1942, April 1946 to current year).
a--Also occurred on July 26.
b--Gage height, 3.31 ft.
c--Backwater from ice.
d--At previous site and datum.
e--Estimated.

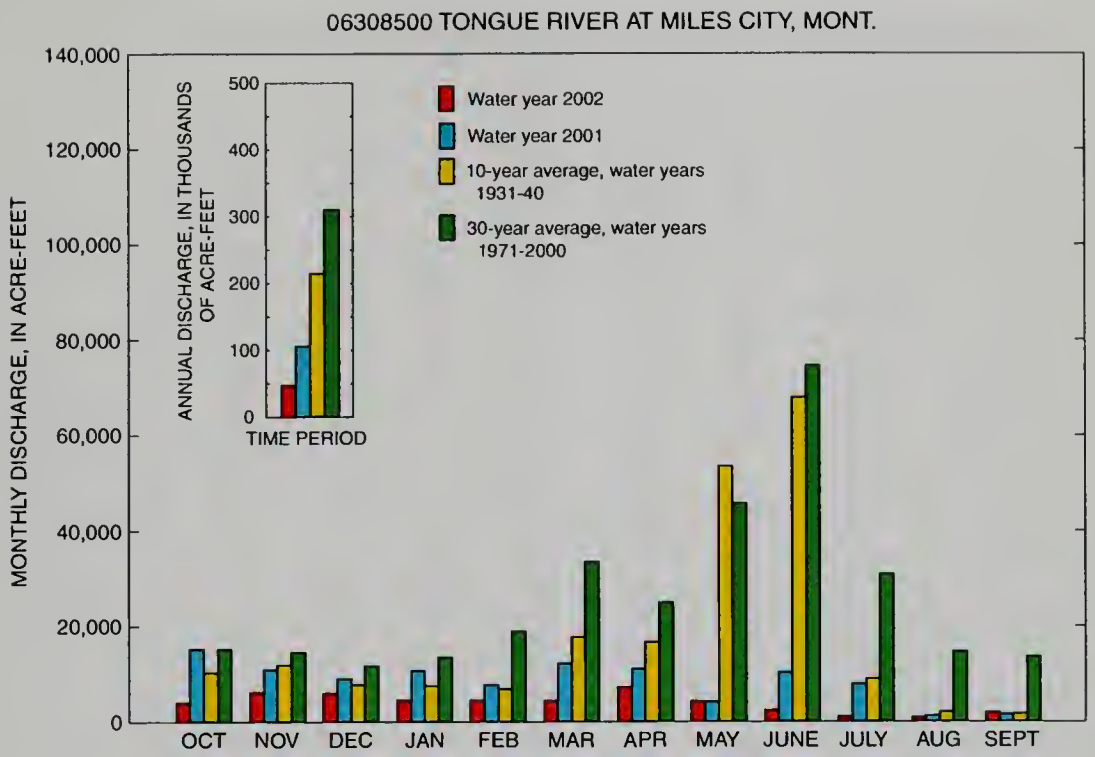


Figure 3. Comparison of discharge of the Tongue River during water year 2002 with discharge during water year 2001 and with 10-year and 30-year average discharges.

LOCATION.--Lat 46°25'48", long 105°18'34", in SW¼SW¼SE¼ sec. 23, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank at downstream side of bridge on U.S. Highway 12, 0.1 mi west of Locate, and 25 mi east of Miles City, and at river mile 29.4.

DRAINAGE AREA.--13,189 mi².

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS.--WSP 926: 1939. WSP 1309: 1938-39 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,384.79 ft (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11, 1947 to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different datum. Oct. 1, 1965 to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966 to Mar. 21, 1978, water-stage recorder at present site and datum. Mar. 22, 1978 to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different datum, Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and datum, and Aug. 21, 1981 to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different datum. Oct. 1, 1981 to Apr. 5, 1995 water-stage recorder at site 1.5 miles downstream at different datum. Apr. 7, 1995 to present, water-stage recorders located on each bank and used depending on control conditions.

REMARKS.--Discharge records good except those for estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.8	86	e110	e45	e75	e100	e220	245	65	e10	17	e1500
2	6.6	84	e140	e50	e75	e90	e280	238	57	4.3	11	e1050
3	6.4	87	e110	e65	e80	e100	e300	250	51	4.7	6.9	778
4	6.8	89	e110	e80	e80	e105	e500	240	53	5.2	5.0	655
5	6.9	92	e100	e70	e85	e105	e600	210	45	3.2	4.4	506
6	7.6	94	e100	e60	e85	e110	e650	208	37	e3.5	4.0	428
7	7.9	99	e110	e50	e85	e115	e700	215	33	e4.0	25	372
8	8.2	101	e100	e55	e85	e105	e700	235	95	e6.0	125	394
9	8.1	105	e100	e55	e85	e95	e800	202	67	e15	89	325
10	8.3	e110	e95	e55	e85	e105	719	212	57	e20	47	270
11	8.7	e110	e90	e55	e85	e115	634	252	80	8.0	39	240
12	9.2	e110	e90	e55	e90	e115	591	231	85	3.8	18	221
13	9.8	e110	e95	e60	e90	e120	533	192	60	4.3	8.7	205
14	9.4	e120	e100	e60	e90	e120	463	171	38	3.4	4.0	186
15	9.7	e125	e100	e60	e95	e115	409	161	33	2.2	3.6	166
16	9.7	136	e105	e65	e100	e105	347	136	33	1.6	3.0	151
17	13	139	e110	e70	e100	e105	288	124	34	10	1.8	144
18	20	150	e105	e70	e110	e105	313	112	33	23	2.0	137
19	24	137	e90	e70	e110	e110	312	121	34	13	1.3	142
20	30	134	e80	e70	e115	e110	317	112	33	9.0	0.46	128
21	35	135	e75	e70	e115	e115	282	115	33	4.8	0.85	122
22	38	128	e80	e70	e115	e115	275	106	34	2.5	0.80	128
23	43	146	e85	e70	e120	e125	290	104	50	1.2	1.6	121
24	51	147	e90	e65	e115	e115	375	95	59	1.3	4.1	112
25	59	147	e90	e65	e100	e110	348	92	e55	0.83	4.2	108
26	66	141	e90	e70	e90	e110	304	108	e50	1.0	3.6	98
27	73	e90	e85	e70	e95	e130	284	110	e45	0.37	55	102
28	76	e80	e70	e70	e105	e170	263	131	e40	15	106	104
29	79	e90	e55	e70	---	e160	257	151	e30	36	93	120
30	82	e110	e50	e55	---	e180	252	97	e20	62	65	116
31	85	---	e45	e70	---	e200	---	82	---	32	57	---
TOTAL	904.1	3432	2855	1965	2660	3680	12606	5058	1439	311.20	807.31	9129
MEAN	29.16	114.4	92.10	63.39	95.00	118.7	420.2	163.2	47.97	10.04	26.04	304.3
MAX	85	150	140	80	120	200	800	252	95	62	125	1500
MIN	6.4	80	45	45	75	90	220	82	20	0.37	0.46	98
AC-FT	1790	6810	5660	3900	5280	7300	25000	10030	2850	617	1600	18110

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2002, BY WATER YEAR (WY)

MEAN	252.2	220.4	150.4	143.3	433.7	1237	744.5	1154	1616	571.4	215.9	171.3
MAX	921	790	417	476	3850	4627	3062	5970	8045	2015	1096	898
(WY)	1941	1999	1942	1981	1943	1972	1965	1978	1944	1993	1941	1941
MIN	1.77	12.5	12.5	4.53	2.82	80.2	109	114	48.0	10.0	1.30	0.19
(WY)	1961	1961	1961	1950	1950	1950	1961	2001	2002	2002	1988	1960

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1939 - 2002	
ANNUAL TOTAL	65200.8		44846.61			
ANNUAL MEAN	178.6		122.9		575.7	
HIGHEST ANNUAL MEAN					1622	1944
LOWEST ANNUAL MEAN					79.4	1961
HIGHEST DAILY MEAN	2560	Jul 27	1500	Sep 1	26000	Feb 19 1943
LOWEST DAILY MEAN	4.7	Sep 5	0.37	Jul 27	0.00	Jan 16 1950
ANNUAL SEVEN-DAY MINIMUM	5.3	Aug 30	1.3	Aug 17	0.00	Jan 16 1950
MAXIMUM PEAK FLOW			1970	Sep 1	31000	Feb 19 1943
MAXIMUM PEAK STAGE			3.77	Sep 1	a12.20	Mar 16 1978
INSTANTANEOUS LOW FLOW			0.00	Jul 27	b0.00	Jul 30 1998
ANNUAL RUNOFF (AC-FT)	129300		88950		417100	
10 PERCENT EXCEEDS	461		266		1350	
50 PERCENT EXCEEDS	110		90		240	
90 PERCENT EXCEEDS	8.7		6.5		40	

a--Backwater from ice.
b--On many days in 1950, 1960-61, and 1988.
e--Estimated.

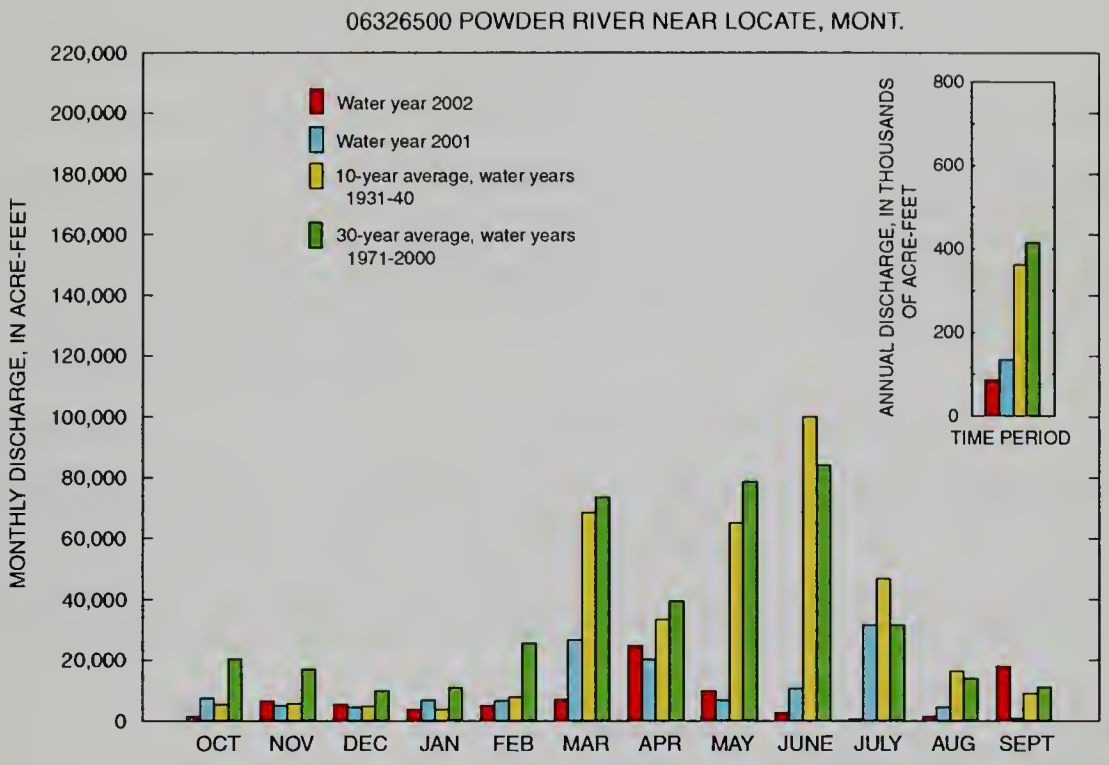


Figure 4. Comparison of discharge of the Powder River during water year 2002 with discharge during water year 2001 and with 10-year and 30-year average discharges.

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS COMPLETED AFTER JANUARY 1, 1950

06258900 Boysen Reservoir, Wyo.

LOCATION.--Lat 43°25'00", long 108°10'37", in $NW^1/_4NW^1/_4$ sec. 16, T.5 N., R.6 E., Fremont County, Hydrologic Unit 10080005, at dam on Wind River and 13 mi north of Shoshoni, Wyoming.

DRAINAGE AREA.--7,700 mi^2.

PERIOD OF RECORD.--October 1951 to current year (month-end contents only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (levels by Bureau of Reclamation).

REMARKS.--Reservoir is formed by rock-fill dam completed in October 1951. Storage began Oct. 11, 1951. Usable capacity, 701,500 acre-ft between elevation 4,657.00 ft, invert of penstock pipe, and 4,725.00 ft, top of spillway gate. Dead storage, 40,080 acre-ft below elevation 4,657.00 ft. Prior to Jan. 1, 1966, usable capacity was 757,800 acre-ft and dead storage was 62,000 acre-ft at same elevations. Between January 1966 and October 1996, usable capacity was 742,100 acre-ft and dead storage was 59,880 acre-ft, at same elevations. Crest of dam is at elevation 4,758.00 ft. Water used for irrigation, flood control, and power generation.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 862,500 acre-ft, July 6, 7, 1967, elevation, 4,730.83 ft; minimum daily contents since normal use of water started, 191,900 acre-ft, Mar. 18, 19, 1956, elevation, 4,684.18 ft, capacity table then in use.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 288,200 acre-ft, April 21, elevation, 4,696.34 ft; minimum daily contents, 195,700 acre-ft, September 24, elevation, 4,686.87 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2001	4,694.04	264,300	---
October 31	4,693.56	259,400	-4,900
November 30	4,693.27	256,500	-2,900
December 31	4,693.80	261,900	+5,400
January 31, 2002	4,694.22	266,200	+4,300
February 28	4,694.60	270,100	+3,900
March 31	4,695.91	283,700	+13,600
April 30	4,695.91	283,700	0
May 31	4,692.42	248,000	-35,700
June 30	4,693.62	260,100	+12,100
July 31	4,690.69	231,200	-28,900
August 31	4,687.80	204,100	-27,100
September 30, 2002	4,687.23	198,900	-5,200
2002 water year			-65,400

06260300 Anchor Reservoir, Wyo.

LOCATION.--Lat 43°39'50", long 108°49'27", in sec. 26, T.43 N., R.100 W., Hot Springs County, Hydrologic Unit 10080007, at dam on South Fork Owl Creek, 2 mi downstream from Middle Fork, 3 mi southeast of Anchor, and 32 mi west of Thermopolis.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--November 1960 to current year (month-end contents only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929 (Bureau of Reclamation benchmark).

REMARKS.--Reservoir is formed by concrete arch dam completed in 1960. Usable capacity, 17,160 acre-ft between elevation 6,343.75 ft, invert of river outlet, and 6,441.00 ft, spillway crest, including 68 acre-ft below elevation 6,343.75 ft. Prior to Oct. 1, 1971, usable capacity was 17,280 acre-ft, including 149 acre-ft below the invert. Water is used for irrigation of land in Owl Creek basin.

COOPERATION.--Records furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 9,250 acre-ft, July 4, 1967, elevation, 6,418.52 ft; no usable storage on many days some years.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 857 acre-ft, May 21, elevation, 6,369.10 ft; minimum daily contents, 233 acre-ft, Nov. 11 to Mar. 27, elevation, 6,354.00 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2001	6,355.40	266	---
October 31	6,355.80	277	+11
November 30	6,354.00	233	-44
December 31	6,354.00	233	0
January 31, 2002	6,354.00	233	0
February 28	6,354.00	233	0
March 31	6,355.50	268	+35
April 30	6,359.50	396	+128
May 31	6,366.78	721	+325
June 30	6,357.86	341	-380
July 31	6,356.19	289	-52
August 31	6,355.51	268	-21
September 30, 2002	6,355.00	254	-14
2002 water year			-12

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18'27", long 107°57'26", in $SW^1/_4SE^1/_4$ sec.18, T.6 S., R.30 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southwest of St. Xavier, and at river mile 86.6.

DRAINAGE AREA.--19,626 mi^2.

PERIOD OF RECORD.--November 1965 to current year (month-end contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file at the USGS office in Helena, Mont.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is 3,296.5 feet (levels by Bureau of Reclamation).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,312,000 acre-ft, between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest, 3,593.00 ft. Normal maximum operating level, 1,097,000 acre-ft, elevation, 3,640.00 ft. Minimum operating level, 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage, 16,010 acre-ft, below elevation 3,296.50 ft. Water is used for power production, flood control, irrigation, and recreation.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 607,200 acre-ft, September 9, 2002, elevation 3,576.15 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 757,000 acre-ft, November 10, elevation, 3,605.02 ft; minimum, 607,200 acre-ft, September 9, elevation, 3,576.15 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2001	3,602.82	744,400	--
October 31	3,604.87	756,100	+11,700
November 30	3,604.35	753,100	-3,000
December 31	3,599.47	725,700	-27,400
January 31, 2002	3,594.91	701,100	-24,600
February 28	3,588.82	669,500	-31,600
March 31	3,587.80	664,300	-5,200
April 30	3,586.33	656,900	-7,400
May 31	3,583.44	642,600	-14,300
June 30	3,593.47	693,500	+50,900
July 31	3,585.73	654,000	-39,500
August 31	3,577.25	612,400	-41,600
September 30, 2002	3,578.61	619,000	+6,600
2002 water year			-125,400

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS EXISTING ON JANUARY 1, 1950

The extent, if any, to which the use of reservoirs in this section may be subject to Compact allocations was not determined. As a matter of hydrologic interest, the month-end usable contents in acre-feet of four reservoirs are given. The first three reservoirs are in the Bighorn River basin, Wyoming, and data on contents were furnished by the Bureau of Reclamation. The Tongue River Reservoir in Montana is operated under the supervision of the Water Resources Division of the Montana Department of Natural Resources and Conservation, which furnished the water-level data and the reservoir-capacity table.

	Usable contents, in acre-feet			
Month	06224500 Bull Lake	Pilot Butte Reservoir	06281500 Buffalo Bill Reservoir	06307000 Tongue River Reservoir
September 30, 2001	26,160	654	267,400	16,500
October 31	27,330	13,310	261,300	17,150
November 30	27,960	26,300	272,500	19,370
December 31	28,400	25,960	276,100	19,940
January 31, 2002	28,250	25,830	280,200	21,100
February 28	28,160	25,820	283,300	22,540
March 31	27,900	25,750	287,500	26,620
April 30	28,240	25,720	299,800	33,720
May 31	37,660	16,490	316,000	39,710
June 30	86,320	26,630	496,300	42,720
July 31	94,710	20,770	492,100	29,510
August 31	54,740	11,020	415,600	25,190
September 30, 2002	40,180	3,000	358,900	26,080
Change in contents during water year	+14,020	+2,350	+91,500	+9,580

RULES AND REGULATIONS FOR ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

A compact, known as the Yellowstone River Compact, between the States of Wyoming, Montana, and North Dakota, having become effective on October 30, 1951, upon approval of the Congress of the United States, which apportions the waters of certain interstate tributaries of the Yellowstone River which are available after the appropriative rights existing in the States of Wyoming and Montana on January 1, 1950 are supplied, and after appropriative rights to the use of necessary supplemental water are also supplied as specified in the Compact, is administered under the following rules and regulations subject to the provisions for amendment revision or abrogation as provided herein.

Article I. Collection of Water Records

A. It shall be the joint and equal responsibility of the members of the States of Wyoming and Montana to collect, cause to be collected, or otherwise furnish records of tributary streamflow at the points of measurement specified in Article V (B) of the Compact, or as near thereto as is physically or economically feasible or justified.

1. Clarks Fork

The gaging station known as Clarks Fork near Silesia, Montana and located in NW1/4 SE1/4 sec. 1, T. 4 S., R. 23 E., shall be the point of measurement for the Clarks Fork.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River above Tullock Creek, near Bighorn, Montana, and located in SE1/4 SE1/4 NE1/4 sec. 3, T. 4 N., R. 34 E., shall temporarily be the designated point of measurement on that stream. The flow of the Little Bighorn River as measured at the gaging station near Hardin, Montana, and located in SE1/4 NE1/4 NE1/4 sec. 19, T. 1 S., R. 34 E., shall be considered the point of measurement for that stream, except that if or when satisfactory records are not available, the records for the nearest upstream station with practical corrections for intervening inflow or diversion shall be used.

3. Tongue River

The gaging station known as the Tongue River at Miles City, Montana, and located in NE1/4 NE1/4 SE1/4 sec. 23, T. 7 N., R. 47 E., shall temporarily be the point of measurement for that stream.

4. Powder River

The gaging station known as the Powder River near Locate, Montana, and located in NW1/4 SW1/4 sec. 14, T. 8 N., R. 51 E., shall temporarily be the designated point of measurement for that stream.

B. Records of total annual diversion in acre-feet above the points of measurement designated in the Compact for irrigation, municipal, and industrial uses developed after January 1, 1950, shall be furnished by the members of the Commission for their respective States, at such time as the Commission deems necessary for interstate administration as provided by the terms of the Compact. Providing that if it be acceptable to the Commission, reasonable estimates thereof may be substituted.

C. Annual records of the net change in storage in all reservoirs, not excluded under Article V (E) of the Compact, above the point of measurement specified in the Compact and completed after January 1, 1950, and the annual net change in reservoirs existing prior to January 1, 1950, which is used for irrigation, municipal, and industrial purposes developed after January 1, 1950, shall be the primary responsibility of the member of the Commission in whose State such works are located; providing such data are not furnished by Federal agencies under the provisions of Article III (D) of the Compact, or collected by the Commission.

Article II. Office and Officers

A. The office of the Commission shall be located at the office of the Chairman of the Commission.

B. The Chairman of the Commission shall be the Federal representative as provided in the Compact.

C. The Secretary of the Commission shall be as provided for in Article III of these rules.

D. The credentials of each member of the Commission shall be placed on file in the office of the Commission.

Article III. Secretary

A. The Commission, subject to the approval of the Director of the United States Geological Survey, shall enter into cooperative agreements with the U.S. Geological Survey for such engineering and clerical services as may reasonably be necessary for the administration of the Compact. Said agreements shall provide that the Geological Survey shall:

1. Maintain and operate gaging stations at or near the points of measurement specified in Article V (A) of the Compact.

2. Assemble factual information on stream flow, diversion, and reservoir storage for the preparation of an annual report to the Governors of the signatory States.

3. Make such investigations and reports as may be requested by the Commission in aid of its administration of the Compact.

B. The Geological Survey shall act as Secretary to the Commission.

Article IV. Budget

A. At the annual meeting of each even-numbered year or prior thereto, the Commission shall adopt a budget for operation during the ensuing biennium beginning July first. Such budget shall set forth the total cost of construction, maintenance and operation of gaging stations, the cost of engineering and clerical aid, and other necessary expenses excepting the salaries and personal expenses of the Commissioners. On odd-numbered years revisions of the budget shall be considered.

B. It shall be the obligation of the Commissioners of the States of Montana and Wyoming to endeavor to secure from the Legislature of their respective States sufficient funds with which to meet the obligations of this Compact, except insofar as provided by the Federal government.

Article V. Meetings

An annual meeting of the Commission shall be held each November at some mutually agreeable point in the Yellowstone River Basin for consideration of the annual report for the water year ending the preceding September 30th, and for the transaction of such other business consistent with its authority; provided that by unanimous consent of the Commission the date and place of the annual meeting may be changed. Other meetings as may be deemed necessary shall be held at a time and place set by mutual agreement, for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approval by the Commissioners for the States of Wyoming and Montana.

Article VI. Amendments, Revisions and Abrogations.

The Rules and Regulations of the Commission may be amended or revised by a unanimous vote at any meeting of the Commission.

Gary Fritz
Commissioner for Montana

George L. Christopulos
Commissioner for Wyoming

ATTESTED:

L. Grady Moore
Federal Representative

Adopted November 17, 1953
Amended December 16, 1986

RULES FOR THE RESOLUTION OF DISPUTES OVER THE ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

December 19, 1995

Section I. General Framework

According to Article III(F) of the Yellowstone River Compact,

"In case of the failure of the representatives of Wyoming and Montana to unanimously agree on any matter necessary to the proper administration of this compact, then the member selected by the director of the United States Geological Survey shall have the right to vote upon the matters in disagreement and such points of disagreement shall then be decided by a majority vote of the representatives of the states of Wyoming and Montana and said member selected by the director of the United States geological survey, each being entitled to one vote."

Section II. Purpose and Goal

A. The purpose of these rules is to clarify and more fully develop the dispute resolution process outlined in Section I.

B. The goal of the dispute resolution process outlined in these rules is to encourage joint problem solving and consensus building. It consists of three phases -- unassisted negotiation, facilitation, and voting.

C. Any agreement reached through this process is binding on Montana, Wyoming, and the United States Geological Survey (USGS).

D. Either state can initiate the dispute resolution process defined in Sections IV, V, and VI, and the other state is obligated to participate in good faith. The states agree that the issues pursued under this dispute resolution process shall be both substantive and require timely resolution.

Section III. Consensus

A. In the process of administering the Yellowstone River Compact, the representatives from Montana and Wyoming agree to seek consensus.

B. For purposes of this rule, consensus is defined as an agreement that is reached by identifying the interests of Montana and Wyoming and then building an integrative solution that maximizes the satisfaction of as many of the interests as possible. The process of seeking consensus does not involve voting, but a synthesis and blending of alternative solutions.

Section IV. Unassisted Negotiation

A. In all situations, the representatives from Montana and Wyoming shall first attempt to seek consensus through unassisted negotiation. The federal representative will not serve as chairperson in the unassisted negotiation process.

B. During a negotiation process, the representatives from Montana and Wyoming shall identify issues about which they differ, educate each other about their needs and interests, generate possible resolution options, and collaboratively seek a mutually acceptable solution.

C. To help facilitate negotiations, the representatives from Montana and Wyoming in cooperation with the USGS agree to share technical information and develop joint data bases. Other data sources may also be used.

D. The USGS shall serve as technical advisor in the two-state negotiations.

Section V. Facilitation

A. If the representatives from Montana and Wyoming are not able to reach consensus through unassisted negotiation, they shall each identify, articulate, and exchange, in writing, the unresolved issues.

B. The representatives from Montana and Wyoming shall then jointly appoint a facilitator to assist in resolving the outstanding dispute. If the representatives from Montana and Wyoming cannot identify a mutually acceptable facilitator, the representative appointed by the USGS shall appoint a facilitator.

C. A facilitator, for purposes of this rule, is defined as a neutral third party that shall help the representatives from Montana and Wyoming communicate, negotiate, and reach agreements voluntarily. The facilitator is not empowered to vote or render a decision.

D. The facilitator shall assist the representatives from Montana and Wyoming in developing appropriate ground rules for each facilitated session including establishing a deadline for completion of the facilitation process, setting an appropriate agenda, identifying issues, collecting and analyzing technical information, developing options, packaging agreements, and preparing a written agreement. The facilitator reserves the right to meet privately with each representative during the facilitation process.

Section VI. Voting

A. If, and only if, the representatives from Montana and Wyoming are unable to reach consensus with the assistance of a facilitator, then a dispute may be settled by voting.

B. The representatives from Montana and Wyoming, along with the representative appointed by the director of the USGS, are each entitled to one vote.

C. If the USGS representative does not vote in accordance with Article III, then the director of the USGS will select, with concurrence from Wyoming and Montana, a neutral third party to vote.

D. If the representative appointed by the director of the USGS is not involved in the steps outlined in Sections IV and V, each state shall have the opportunity to present appropriate information to that representative. This information may be presented through both oral presentations and written documents. All information will be shared with the other state.

   The representative of the USGS may also consult the facilitator referenced in Section V in an attempt to resolve any disputes.

E. The USGS shall pay the expenses of the representative appointed by the director of the USGS.

F. Points of disagreement shall be resolved by a majority vote.

Section VII. Funding

A. The USGS will pay one-half and the states of Montana and Wyoming shall each pay one-quarter of the expenses of the facilitator, which shall not exceed $10,000, unless agreed to by both states and the USGS.

Section VIII. Amendments

A. These rules may be amended or revised by a unanimous vote of the Commission.

Section IX. Execution

These rules for the resolution of disputes over the administration of the Yellowstone River Compact are hereby executed on the date indicated below.

Gary Fritz
Commissioner for Montana

Gordon W. Fassett
Commissioner for Wyoming

William F. Horak
Federal Representative

July 22, 1996
Date

RULES FOR ADJUDICATING WATER RIGHTS ON INTERSTATE DITCHES

Article I. Purpose

The purpose of this rule is to determine and adjudicate, in accordance with the laws of Montana and Wyoming, those pre-Compact (January 1, 1950) water rights diverting from the Powder, Tongue, Bighorn and Clarks Fork Rivers and their tributaries where the point of diversion is in one State and the place of use is in the other State which have not yet been adjudicated.

Article II. Authority

In accordance with the Yellowstone River Compact, the State of Montana and the State of Wyoming, being moved by consideration of interstate comity, desire to remove all causes of present and future controversy between the States and between persons in one State and persons in another State with respect to these interstate ditches. Article III (E) of the Compact provides the Yellowstone River Compact Commission with the authority "...to formulate rules and regulations and to perform any act which they may find necessary to carry out the provisions of this Compact...."

Article III. Definitions

The terms defined in the Yellowstone River Compact apply as well as the following definitions:

1. "Acre-feet" means the volume of water that would cover 1 acre of land to a depth of 1 foot.

2. "Cfs" means a flow of water equivalent to a volume of 1 cubic foot that passes a point in 1 second of time and is equal to 40 miners inches in Montana.

3. "Interstate Ditches" shall include ditches and canals which convey waters of the Bighorn, Tongue, Powder, and Clarks Fork Rivers and their tributaries across the Wyoming-Montana State line where the water is diverted in one State and the place of use is in the other State.

4. "Department of Natural Resources and Conservation," hereafter called the "Department," means the administrative agency and Department of the Executive Branch of the Government of Montana created under Title II, Chapter 15, MCA which has the responsibility for water administration in that State.

5. "Water Court" means a Montana District Court presided over by a water judge, as provided for in Title III, Chapter 7, MCA.

6. "State Engineer" shall be the current holder of the position created by the Wyoming Constitution as Chief Water Administration Official for the State of Wyoming.

7. "Board of Control," hereinafter called the "Board," is defined as the constitutionally created water management agency in Wyoming composed of the four Water Division Superintendents and the State Engineer.

8. "Superintendent" is the member of the Board who is the water administration official for the Water Division where the interstate ditch is located. (The two Water Divisions in the Yellowstone River drainage are Water Division Numbers Two and Three.)

9. "Date of Priority" shall mean the earliest date of actual beneficial use of water, unless evidence and circumstances pertaining to a particular claim establish an earlier date.

10. "Point of Diversion" is defined to be the legal land description by legal subdivision, section, township, and range of the location of the diversion structure for an interstate ditch from a natural stream channel.

11. "Place of Use" is defined to be the legal land description (legal subdivision, section, township, and range) of the lands irrigated by an interstate ditch.

12. "Person" is defined as an individual, a partnership, a corporation, a municipality or any other legal entity, public or private.

13. "Claimant" is defined as any person claiming the use of water from an interstate ditch as herein defined.

Article IV. Procedures

The procedures for determining and adjudicating water rights associated with interstate ditches shall be categorized as follows: (A) Where the point of diversion is in Wyoming and place of use in Montana, and (B) Where the point of diversion is in Montana and place of use in Wyoming.

A. Wyoming Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim. (A sample form for this purpose is attached.)

2. The Yellowstone River Compact Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone Compact Commission, which, when found to be correct and complete, will be forwarded to the Board for verification.

4. Upon receipt of the form, the Board shall forward it to the appropriate Superintendent, who, in cooperation with the Department, will validate the information including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The Superintendent and the Department will utilize aerial photography and other information to have prepared a reproducible map showing the location of the ditch system, lands irrigated, point of diversion, etc., of the claim.

5. After the validation procedure, the Superintendent will hold a hearing, after appropriate notice and advertisement, at which time the claimant shall describe, in detail, the use that has been made of the water and the lands that are being irrigated, establish a priority date, etc. Costs incurred in advertising shall be paid by the claimant. If a single hearing is held to consider several claims, the costs of advertising shall be shared equally among the claimants. Anyone who opposes the claim shall appear and state the reasons, if any, for opposition to the claim. If there is no opposition to the claim, cost incurred in holding the hearing shall be paid by the claimant. If protestants do appear and oppose the claim, hearing costs will be paid 50 percent by the claimant and 50 percent by the protestant, or if there is more than one protestant, the remaining 50 percent shall be shared equally among the protestants.

6. At the conclusion of the hearing, the Superintendent shall forward the record to the Yellowstone River Compact Commission with his findings and recommendations. The Yellowstone River Compact Commission will make the

determination of the amount of the right, the location, and the priority date, and then send the record to the Board.

7. The Board shall review the record and integrate it into its water rights system. Upon entry of the record by the Board, the information shall be forwarded to the Department and the Chairman of the Yellowstone River Compact Commission.

8. Upon the entry of the right into the Board's records, it will have the following attributes:

   a. The right will be a Wyoming water right with a priority date as established by this procedure.

   b. The amount of the right will be determined as provided by Wyoming law.

B. Montana Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim.

2. The Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone River Compact Commission, which, when found to be correct and complete, will be forwarded to the Department for verification.

4. Upon receipt of the form, the Department, in cooperation with the Wyoming State Engineer's Office, will validate the information, including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The appropriate Superintendent and the Department will utilize aerial photographs and other information to have prepared a reproducible map showing the location of the ditch system, land irrigated, point of diversion, etc., of the claim.

5. The Department will then forward the record to the Yellowstone River Compact Commission with its findings and recommendations. Upon approval by the Commission, the record shall be submitted to the Montana Water Court for adjudication. A duplicate record will be forwarded to the Wyoming State Engineer's Office, the Board, and the Chairman of the Yellowstone River Compact Commission upon adjudication.

6. Upon adjudication of the right by the Montana Water Court, it will have the following attributes:

   a) The right will be a Montana water right with a priority date as established by this procedure.

   b) The amount of the right will be determined as provided by Montana law.

Article V. Exclusions

A. These rules recognize the limitation in Article VI of the Yellowstone River Compact regarding Indian water rights.

B. These rules shall not be construed to determine or interpret the rights of the States of Wyoming and Montana to the waters of the Little Bighorn River.

Article VI. Claim Form Submission Period

All claims must be submitted to the Yellowstone River Compact Commission, c/o District Chief, United States Geological Survey, 821 E. Interstate, Bismarck, ND 58501, within 90 calendar days after the claimant has received the claim form from the Commission. The blank claim form will be sent certified mail to the water user and the submission period of 90 calendar days will begin with the next day following receipt of the form, as evidenced by the certified mail receipt card. For good cause shown in writing, an extension of time beyond the 90 days for submittal may be obtained from the Commission.

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING

GORDON W. FASSETT
STATE ENGINEER
HERSCHLER BUILDING
4TH FLOOR EAST
CHEYENNE, WYOMING 82002
(307) 777-7354

UNITED STATES

WILLIAM F. HORAK
CHAIRMAN
U.S. GEOLOGICAL SURVEY
821 E. INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501
(701) 250-4601

MONTANA

GARY FRITZ
ADMINISTRATOR, WATER RESOURCES DIVISION
DEPT. OF NATURAL RESOURCES & CONSERVATION
1520 EAST SIXTH AVENUE
HELENA, MONTANA 59620
(406) 444-6603

YELLOWSTONE RIVER COMPACT COMMISSION

CLAIM FORM FOR INTERSTATE DITCHES

1. Name of ditch or canal: _____

2. Source of water supply: _____

   Tributary of _____

3. Name of claimant: _____

   Address _____

   City _____ State _____Zip Code _____

   Home Phone No. _____ Business Phone No. _____

4. Person completing form: _____

   Address _____

   City _____ State _____Zip Code _____

   Home Phone No. _____ Business Phone No. _____

5. Method of irrigation: _____

6. Point of diversion: County _____ State _____

   Headgate located in the ___¼ ___¼, Section ____, T.___R.____

   (a) Description of headgate: (Briefly describe the materials and general features, date constructed or last known work, general condition.) _____

   _____

   _____

(b) Describe water measuring device: _____

_____

_____

(c) If the point of diversion is in Montana:

1. What flow rate has been claimed?

_____ ☐ cubic feet per second

☐ gallons per minute

☐ miner's inches

2. What volume of water has been claimed?

_____ acre-feet

7. Dimensions of ditch at headgate: Width at top (at waterline) _____ feet; width at bottom _____ feet; side slopes (vertical:horizontal) _____:_____; depth of water _____ feet; grade _____ feet per mile.

8. Place of use and acres irrigated: County_____ State ____ Give legal subdivisions of land owned by you on which water is being used (acres claimed): An example field is shown in the first line.

T.	R.	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	MW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
58N	95W	18			25.1											10.2			35.3

9. Describe any additional uses of water claimed from the ditch: _____

10. Date of first beneficial use of water (priority date) on lands described above for _____ Ditch is _____ (mo/day/yr) and shall be the same for all lands claimed on this form.

11. Has irrigation water been diverted onto all lands shown in the above tabulation each year since completion of works? __ If not, state exceptions and reasons therefore: _____

_____

_____

12. Attach documentary evidence or affidavits showing your ownership or control of the above lands, as well as the historic use of water on these lands. _____

_____

_____

13. What permit or claim numbers have been assigned to known records filed with either the Wyoming State Engineer's Office or the Montana Department (DNRC) for irrigating the above lands? _____

_____

_____

14. Have personnel in the Wyoming State Engineer's Office or the Montana Department (DNRC) been contacted to obtain the information given in No. 13? ( ) Yes ( ) No

15. Describe any flumes or pipelines in the ditch conveyance system: _____

_____

_____

16. Describe ordinary annual period of use: _____ to _____
(mo/day) (mo/day)

_____.

17. Attach copies of aerial photographs, U. S. Geological Survey maps or other such documents showing the ditch and lands irrigated that give evidence to this claim and may be useful to the Commission.

* * * * * * * * * *

State of _____)
) SS
State of _____)

I, _____, having been duly sworn, depose and say that I, being of legal age and being the claimant of this claim for a water right, and the person whose name is signed to it as the claimant, know the contents of this claim and the matters and things stated there are correct.

_____

_____

Subscribed and sworn before me, this ____day of _____, 19__.

_____
Notary Public

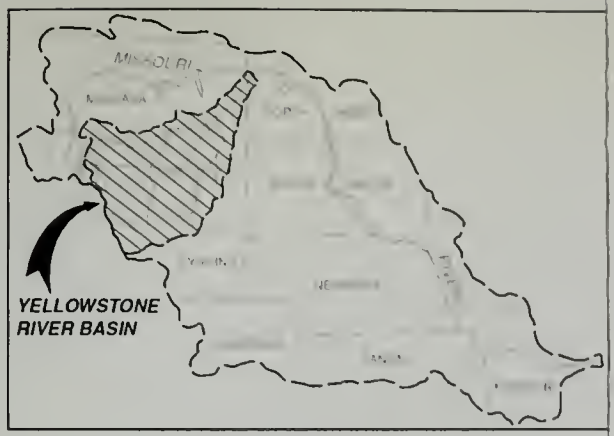
Residing at: _____

My commission expires: _____

CONVERSION TABLE

Multiply inch-pound units	By	To obtain SI units
	Length	
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
	Area	
acres	4,047	square meters (m^2)
	0.4047	*hectares (ha)
	0.4047	square hectometer (hm^2)
	0.004047	square kilometers (km^2)
square miles (mi^2)	2.590	square kilometers (km^2)
	Volume	
cfs-day or second-foot day (ft^3/s-day)	2,447	cubic meters (m^3)
	0.002447	cubic hectometers (hm^3)
cubic feet	0.02832	cubic meters
acre-feet (acre-ft)	1,233	cubic meters (m^3)
	0.001233	cubic hectometers (hm^3)
	0.000001233	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	28.32	liters per second (L/s)
	28.32	cubic decimeters per second (dm^3/s)
	0.02832	cubic meters per second (m^3/s)
acre-feet per year (acre-ft/yr)	1,233	cubic meters per year (m^3/yr)
	0.001233	cubic hectometers per year (hm^3/yr)
	0.000001233	cubic kilometers per year (km^3/yr)

*The unit hectare is approved for use with the International System (SI) for a limited time. See National Bureau of Standards Special Bulletin 330, p. 12, 1977 edition.



LOCATION MAP

YELLOWSTONE RIVER COMPACT COMMISSION

YELLOWSTONE RIVER BASIN

EXPLANATION

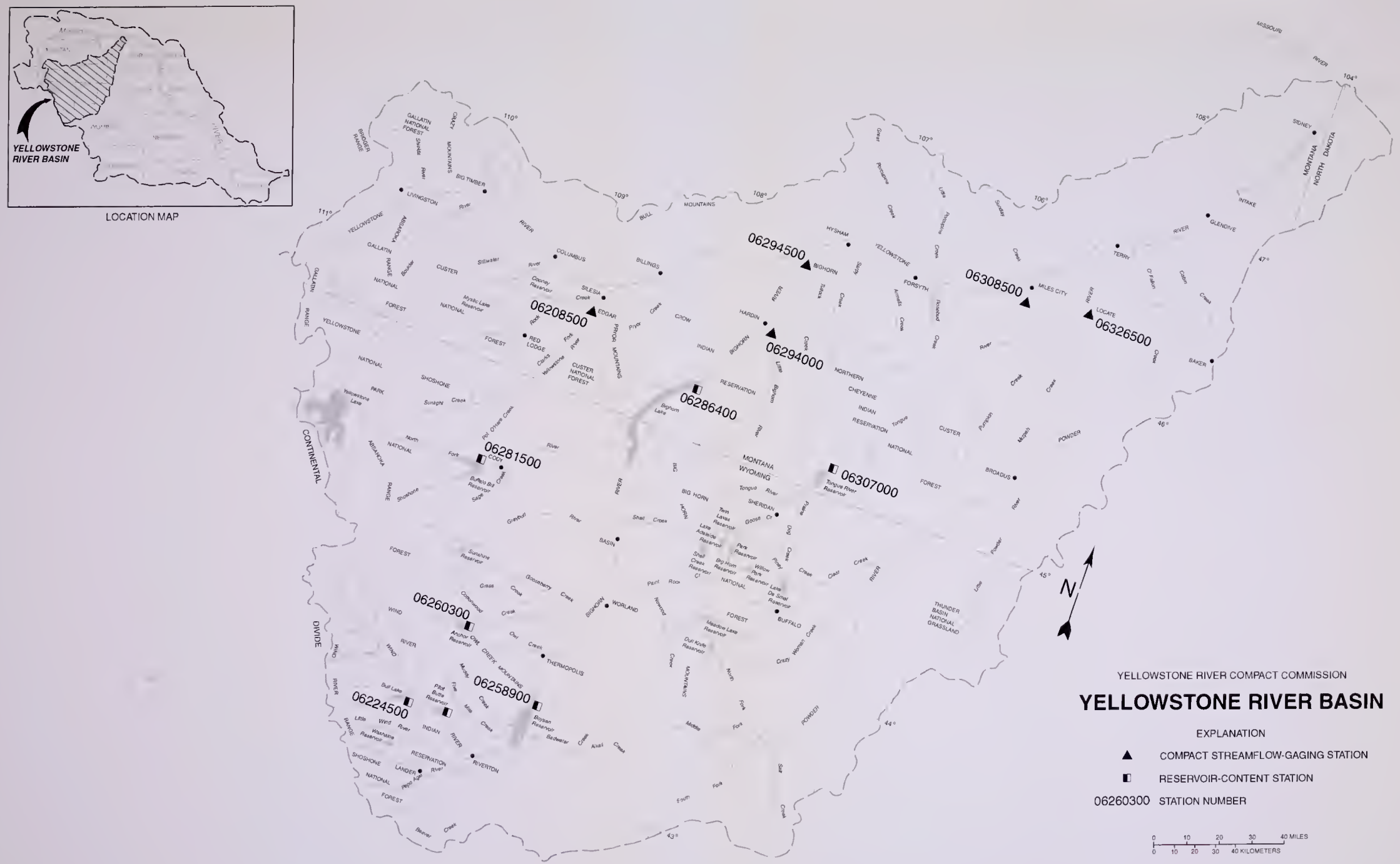
▲ COMPACT STREAMFLOW-GAGING STATION

◧ RESERVOIR-CONTENT STATION

06260300 STATION NUMBER

0 10 20 30 40 MILES
0 10 20 30 40 KILOMETERS

NS



MAP SHOWING LOCATIONS OF COMPACT STREAMFLOW-GAGING AND RESERVOIR-CONTENT STATIONS